

USAWC STRATEGY RESEARCH PROJECT

THE MANPAD THREAT TO CIVILIAN AIRLINERS

by

Lieutenant Colonel Kevin M. Iiams
United States Marine Corps

Colonel George T. Doran
Project Adviser

This SRP is submitted in partial fulfillment of the requirements of the Master of Strategic Studies Degree. The U.S. Army War College is accredited by the Commission on Higher Education of the Middle States Association of Colleges and Schools, 3624 Market Street, Philadelphia, PA 19104, (215) 662-5606. The Commission on Higher Education is an institutional accrediting agency recognized by the U.S. Secretary of Education and the Council for Higher Education Accreditation.

The views expressed in this student academic research paper are those of the author and do not reflect the official policy or position of the Department of the Army, Department of Defense, or the U.S. Government.

U.S. Army War College
CARLISLE BARRACKS, PENNSYLVANIA 17013

Report Documentation Page

Form Approved
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE 15 MAR 2006	2. REPORT TYPE	3. DATES COVERED 00-00-2005 to 00-00-2006		
4. TITLE AND SUBTITLE MANPAD Threat to Civilian Airliners		5a. CONTRACT NUMBER		
		5b. GRANT NUMBER		
		5c. PROGRAM ELEMENT NUMBER		
6. AUTHOR(S) Kevin Liams		5d. PROJECT NUMBER		
		5e. TASK NUMBER		
		5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army War College, Carlisle Barracks, Carlisle, PA, 17013-5050		8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)		10. SPONSOR/MONITOR'S ACRONYM(S)		
		11. SPONSOR/MONITOR'S REPORT NUMBER(S)		
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited				
13. SUPPLEMENTARY NOTES				
14. ABSTRACT See attached.				
15. SUBJECT TERMS				
16. SECURITY CLASSIFICATION OF:		17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES 20	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified			

ABSTRACT

AUTHOR: Lieutenant Colonel Kevin M. Iiams
TITLE: The MANPAD Threat to Civilian Airliners
FORMAT: Strategy Research Project
DATE: 03 March 2006 WORD COUNT: 5,972 PAGES: 19
KEY TERMS: Homeland Security; Non-Proliferation; Airport Security
CLASSIFICATION: Unclassified

This paper investigates strategic approaches to combat the threat of Man Portable Air Defense Systems (MANPADS) to civilian airliners. The current technological approach being applied to defend airliners "after" MANPAD employment merely addresses the tactical issue and allows adversaries a strategic advantage. The United States must strive to prevent and deter the threat from ever achieving the opportunity to launch in order to assure strategic success. This will require a multi-faceted approach that includes a robust and viable U.S. policy abroad, a layered and integrated intelligence and security system to screen our borders and our airports, and a flexible and tailored response should the threat penetrate these defenses.

Detailed research probes the depth and breadth of U.S. foreign policies to manage MANPAD development, proliferation, and access by hostile groups and nations. It also covers the advancement of U.S. internal policies that conjoin intelligence and security initiatives to assure a seamless barrier to threats and their ability to achieve launch opportunities. While considering the significant negative economic impact on the airline industry, the paper concludes with a strategic solution to contend with the structural and systemic challenges of a MANPAD launch on a civilian airliner.

THE MANPAD THREAT TO CIVILIAN AIRLINERS

"Since the tragedies of September 11th, the threat terrorism presents to commercial aviation has been the focus of considerable attention. The latest threat, although not new to the world, is the risk of shoulder-fired missile attacks or Man-Portable Air Defense Systems (MANPADS). There are likely over 700,000 MANPADS worldwide. Certain portions of those weapons are widely available and obtainable on the black market. Information as to the number of MANPADS in the hands of 'non-state' or terrorist groups vary, but at least 27 'non-state' groups have these weapons in Africa, Asia, Europe, the Middle East, and South America. The availability, portability, and concealable make-up of MANPADS all add to the appeal of these weapons to terrorist groups."¹

The preceding excerpt from the Congressional Report on the Commercial Aviation MANPADS Defense Act 2004 (H.R. 4056) highlights the seriousness of the MANPAD threat to U.S. interests. As the emphasis on this problem grows with increasing knowledge of the complexity of the issue, U.S. strategy and policy will have to evolve to keep pace and overmatch the threat. This paper will outline and assess key supporting strategy objectives given in the National Security Strategy (NSS) of the United States as well as those from several of the nested subordinate strategies. The intent is to analyze current strategies, specifically those regarding MANPADS, and how the current "ways and means" miss the desired ends outlined in the national strategies. To date, the Department of State, the Department of Defense, the Legislative Branch, and the Executive Branch all have policy initiatives to secure national strategy objectives regarding the MANPAD threat. Spawning by these policies, or tangential to them, were several in-depth studies that have attempted to define and outline the threat and provide substantive statistics for future policy formulation. The resulting information, daunting in its indications of the likelihood and potential consequences of a MANPAD attack, has renewed the interest and impetus for an evolving strategic solution. The ultimate intent of this paper is to address speculative thought on how emerging strategy initiatives in the technical realm must be integrated with established proliferation policy and extrapolated even further into a specific full spectrum and layered defense strategy.

Current Policy from the Strategy Documents

Current U.S. policy regarding the MANPAD threat to civilian airliners is predominantly focused on proliferation. However, proliferation is only vaguely defined in U.S. policy, and references to non-proliferation and counter-proliferation initiatives typically have nuclear, biological, or chemical overtones. Weapon of Mass Destruction (WMD) has become the catch

phrase to incorporate all three of these areas, but even this phrase has recently been modified to WMD/E to incorporate an emerging area which is “WMD like Effects.”² After the fall of the World Trade Center Towers on 9/11, it would be hard to argue that a MANPAD downing an airliner in an urban area wouldn’t produce “WMD-like effects,” thus meriting its inclusion in WMD/E category of threats. In light of that assumption, many of the current policy initiatives regarding non-proliferation and counter-proliferation of WMD/E will be addressed in relation to the MANPAD threat.

For the sake of argument in this paper, non-proliferation will be defined as those efforts to preemptively prevent the spread of MANPADs. Counter-proliferation will be defined as actions and efforts to curb active proliferation when non-proliferation efforts have failed or where they were non-existent.

Although the NSS does not specifically recognize the MANPAD threat, the document sets the basis for MANPAD proliferation policy and acts as a divining rod for the subordinate policies. The first objective along these lines is our need to *Strengthen alliances to defeat global terrorism and to work to prevent attacks against us and our allies* and the second is to *Prevent our enemies from threatening us, our allies or our friends with WMD*. To expand on those objectives, threats must be identified and destroyed before they reach our borders, and terrorist groups must be denied sponsorship, support, and sanctuary.³ Proactive counter-proliferation efforts to include detection, defense, and counter force are in our national best interest. Non-proliferation is also in our interest, and through strengthened alliances, efforts have secured a \$20 billion pledge from the G-8 to prevent rogue states from acquiring material, technology, and expertise for WMD/E.⁴

The guidance from the NSS distills down nicely to the National Defense Strategy (NDS) which continues to expand on the topic. The opening of the NDS places the threats facing the United States into differing categories. The MANPAD threat falls into the “Catastrophic Threat” category. Catastrophic threats are defined as challenges that involve the acquisition and possible use of WMD or methods producing “WMD-like effects.”⁵ As previously asserted, MANPADS can produce these effects, and thus subjects the threat, at least peripherally, to overall WMD proliferation efforts. NDS objectives that support WMD proliferation efforts, and therefore MANPAD proliferation efforts, are far reaching. The NDS seeks to *Secure the U.S. from Direct Attack and Strengthen Alliances and Partnerships*. It intends to accomplish this by dissuading potential adversaries from adopting threatening capabilities (non proliferation) and defeating adversaries by attacking their weapons, including WMD (counter-proliferation).⁶ The NDS also asserts that the U.S cannot allow adversaries the opportunity to strike first. The NDS

directs that an active and layered defense, coupled with increased intelligence capabilities, will be necessary to disrupt and defeat this threat at a safe distance.

One of the final strategy documents with links to MANPAD proliferation is the National Military Strategy (NMS). The NMS directs that the military will conduct actions from “active counter proliferation to military action that supports non-proliferation policies of WMD/E.”⁷ Here again, the assumption is that WMD/E is inclusive of the MANPAD threat to commercial aviation. “That assumption notwithstanding, the NMS directs that the global proliferation of a wide range of technologies and weapons is a threat to our warfighting capability, and allows adversaries to threaten the United States. The U.S. must deny adversaries these disruptive technologies and weapons.”⁸

The final MANPAD pertinent strategy document to be discussed is the National Strategy for Combating Terrorism. As the latest in the series of documents it defines a 4D (Defeat, Deny, Diminish, and Defend) methodology to combat terrorism. The Deny and Diminish aspects of the methodology lend themselves neatly to non-proliferation and counter-proliferation ends. This strategy goes further in identifying and clarifying the U.S. requirements to prevent terrorists from acquiring technologies and disrupting their material support.⁹ While the Defeat and Defend aspects of the 4D methodology might not apply to proliferation efforts they play greatly into the subsequent layers of protection that will be suggested later.

Although national objectives (ends) regarding proliferation are well defined in the national strategies, these documents were only recently issued and as such national policy development regarding MANPAD proliferation was slow to gain momentum. Following September 11th, the first national policy to address any aspect of the subject of MANPAD proliferation was the Patriot Act of 2001. Not only did this give the President the authority to “strike” at responsible parties for certain acts, it initiated a reformation in the intelligence community that would enable the United States to deftly handle time sensitive and previously fire-walled or stove piped information. This type of intelligence restructuring would lay a path for future implementation of a robust and layered policy to defeat threats, like MANPADS, that originate in foreign environments but seek to permeate the seams between U.S. international and domestic intelligence agencies to cause effects in the U.S. mainland. In Section 801 of the Patriot Act, the document specifically addresses the terror threat to mass transit systems and section 803 addresses the issues regarding the harboring or assisting of terrorists. The content of both of these sections coupled with the critical infrastructure policy in section 1016, enables the application of the act in support of the MANPAD threat. As a fairly complete document, the Patriot Act also set up the Counterterrorism Fund that established the fiscal means to

accomplish the tasks set out.¹⁰ Without other guidance, the Patriot Act was the only official document that gave any authority and direction, although very loosely interpreted, to pursue non-proliferation and counter-proliferation of MANPADS. Hence the “ways” and “means” for MANPADS proliferation policy established in the Patriot Act weren’t truly enabled until the strategic ends in the National Strategies were published.

MANPAD proliferation policies picked up energy during the recent strategy formulation process and following the publication of the current documents. Several diplomatic avenues were pursued by the Executive Branch on the international front to establish a global “toehold” while the strategies developed. Initially targeting the largest and most influential international body that dealt with proliferation, the Wassenaar, the United States continued to advance and engage other influential global groups, such as the G-8 and the Asian Pacific Economic Cooperation (APEC), to build increasing and interconnected international support.

The first and most promising piece of diplomacy regarding MANPADS non-proliferation is the Wassenaar Arrangement. The Wassenaar Arrangement is the first global multi-lateral arrangement for conventional weapons and sensitive dual use technology. It has 33 signatory members that initiated the arrangement in April of 1996. At the time of the arrangement’s inception, the MANPAD and its associated technologies were exempt from any controls or proliferation restrictions. This remained the state until the Wassenaar Plenary meeting of 2003, at which time, a detailed addition was made to the agreement regarding MANPADs. Changes in the Arrangement included detailed specifications of MANPADs and the associated technology. Tight export controls were imposed with requirements for any manufacturing nation to exercise great prudence in exporting the weapons. Approval for export was to be placed and remain at the policy maker level only. Exporting nations must provide other members of the Arrangement visibility on any export or trade of the weapons. Strict tracking of exports, even after they leave the export country, and improved security measures for transport were mandated to all exporters. Stockpiles were to be managed very carefully with the exporting nation providing adequate security training and buy-back options to recipients. Violations were to be subject to adequate penalties to include criminal sanctions.¹¹ The final version of the 2003 Plenary was approved in December 2003.

The 2003 Plenary resolutions of the Wassenaar Arrangement were a significant enabler to follow-on diplomatic efforts in the pursuit of MANPAD proliferation. In June 2003 the topic of the MANPAD threat to commercial aviation was readdressed to the G-8 Summit in Evian, France. The topic had been discussed in 1998 and again following the attacks of September 11, but with growing global concern and the recent Wassenaar impetus, the G-8 finally issued specific

resolution on the subject. In an “Action Plan,” the G-8 committed themselves to reducing proliferation and implemented measures to combat the illegal use of the weapons. Recognizing the significant strides the Wassenaar Arrangement had already made, the G-8 re-emphasized the promotion of those principles adding the G-8’s weighty and united agreement. In addition to Wassenaar, the G-8 implemented several additional steps of its own. It agreed to provide additional assistance to secure and manage weapon stockpiles to include destruction of surplus weapons beyond national defense needs. It also unanimously decided to adopt strict export controls and tracking methods to ensure these weapons end up only in the hands of responsible state actors. Lastly the G-8 pledged over \$20 billion in support of these initiatives, which has secured additional means for future proliferation efforts.¹²

The third major diplomatic initiative was undertaken in October 2003 at the 2003 Asian Pacific Economic Cooperation (APEC) meeting. At this meeting the United States enjoined the members of APEC to consider and address the MANPAD issue. APEC recognized the immediacy of the threat, likely due to the great number of proliferated threats in their own hemisphere, and along much the same lines as the Wassenaar Arrangement and the Evian G-8 Summit, APEC issued the 2003 Leaders Declaration. This declaration stated that the members resolution was to strengthen their joint efforts to curb terrorist threats against mass transportation and confront the threat posed by terrorists’ acquisition and use of MANPADS against international aviation by committing to: adopting strict domestic export controls on MANPADS; securing stockpiles; taking domestic action to regulate production, transfer, and brokering; banning transfers to non-state end-users; and exchanging information in support of these efforts. They also agreed to continue efforts to strengthen domestic controls on MANPADS and to review their progress the following year in Chile.¹³

During this period of international proliferation treaty development, the Department of State was also extremely busy establishing a fledgling foreign policy to combat MANPAD proliferation. The Office of Weapon Removal and Abatement (WRA), whose focus is to curb the illicit trafficking, availability, and indiscriminate use of conventional weapons and to pursue and help manage post-conflict cleanup of such weapons, began a campaign aimed at reducing MANPAD stockpiles. The office strove to limit the access of terrorist or criminal groups to such weapons and munitions.¹⁴ The recent pinnacle of the office’s efforts was a bilateral agreement coordinated between the Government of Hungary, the U.S. Embassy in Budapest, and the Office of Weapons Removal and Abatement in the Department of State’s Bureau of Political-Military Affairs in September 2005, to destroy over 1540 Strela-2 missiles (SA-7). With the continuing efforts of the WRA, the U.S. Department of State has facilitated the destruction of

over 13,000 MANPADS in 13 countries to date.¹⁵ Most recently the WRA gained critical information and has entered negotiations with Nicaragua in an attempt to secure another bilateral agreement. This agreement, if successful, would pull nearly 30,000 MANPADS weapons out of Central America and away from the drug cartel thugs and several crumbling Central and South American democracies that could be pressured into selling these weapons to terrorists for profit or influence.

In concert with the Department of State and the WRA Office, the Department of Defense's Defense Threat Reduction Agency (DTRA) is also taking a focus on destroying the illicit stockpiles of MANPADS. The Department of State (DOS) and DTRA coordinate with the Office of the Secretary of Defense, the Joint Staff, and the appropriate Regional Combatant Command to plan and conduct assessment missions in countries that request Small Arms/ Light Weapons (SA/LW) assistance with little or no cost to the host nation.¹⁶ The combination of DOS and DOD agencies in this mission is a perfect example of the intent of the national strategies to coordinate and complement capabilities across a growing layered defense. It is also indicative of how well the objectives of these national strategies are being supported by adequate ways and means at the highest departmental levels. The efforts of the Department of Defense are integral to the U.S. counter proliferation program.

While these pieces of foreign policy and international cooperation, especially the Wassanar Arrangement, the Hungarian-U.S. bilateral agreement, and hopefully the current efforts with Nicaragua, were significant leaps for U.S. National policy regarding non-proliferation and counter proliferation, the strategy against MANPADS was incomplete. U.S. policy still did not have a unifying or overarching document to tie the objectives (ends), established in national strategy, to the now rapidly developing policy methods (ways). In 2004 Congress approved H.R. 4056, the Commercial Aviation MANPADS Defense Act (CAMDA) bill, which was subsequently signed into law at the end of the year. This bill produced the first end-to-end policy regarding the MANPAD threat. It was initially drafted in early 2004 and by mid-year was subjected to a detailed analysis "Report to Congress" which validated the assumptions and recommendations and even went so far as to include a cost estimate.

"The CAMDA law directs that the United States must take a comprehensive approach to the threat MANPADS pose to commercial aviation. This includes long-term and short-term solutions, as well as domestic and international efforts. CAMDA is intended to make clear that while the DHS is conducting the SD&D Counter-MANPAD program for commercial aircraft, interim solutions to the threat posed by MANPADS should be taken. Specifically, the bill encourages the President to pursue strong international diplomatic and cooperative efforts, including multilateral and bilateral treaties, to limit the availability, transfer and

proliferation of MANPADS and to seek the destruction of excess, obsolete and illicit MANPADS.”¹⁷

The beauty of CAMDA is the unity of the ends, ways, and means equation. Its timely arrival finally tied the effective but rudderless policy initiatives to well defined and coordinated strategic aims and resources of the U.S. The document begins by efficiently defining and validating the MANPAD threat to commercial aviation. The policy then directs a defense in depth approach to the issue with a renewed emphasis on international and diplomatic efforts to curtail proliferation. This “forward edge” of the defense in depth is tied, through cross cutting intelligence programs, to domestic security programs and aircraft defensive countermeasures. The entirety of the CAMDA law is imbedded in the Intelligence Reform Act and thus is well situated to take full advantage of the Intelligence Community’s structural reforms and innovative information sharing strategies that are necessary to bridge the international/ domestic intelligence challenges that are woven into the MANPAD threat.

The Intelligence Reform Act also expands on a few items of the CAMDA and specifically directs the following actions that go well beyond current proliferation initiatives. Article 4026 of the Law enacts the following directly relating to the MANPAD threat:

- Airport vulnerability assessments
- Intelligence sharing and systemic improvements
- Contingency plans for the likelihood or threat of use
- Public education and input to intelligence and reporting

The law also gives “teeth” to the ongoing proliferation efforts by making it a criminal act for other than authorized agencies to possess a MANPAD inside the U.S.. Outside the U.S., jurisdiction is applied if a MANPAD is used or threatened against U.S. property and or citizens. The maximum penalties for violation are \$2 million and imprisonment for life.

To date, the development of U.S. strategy and policy on MANPAD threat has been somewhat of a case of the “cart before the horse.” The Defense Intelligence Agency’s Missile and Space Intelligence Center have long proffered the MANPAD as “The Real Threat” and have completed studies as early as 1999 on the threat to commercial aviation. However, it has obviously taken the events of September 11 coupled with the new found awareness of the growing proliferation of MANPAD weapons to spur changes in national strategy and policy. As emerging strategy struggled to define the desired ends in a complex and volatile environment, policy did not wait. Instead, it rose to the occasion and met the rapidly spreading MANPAD threat with a set of competent and thorough international agreements in support of non-proliferation, and successful Departmental of State foreign policy initiatives. The vast foresight

and fiscal prowess of the Patriot Act created a fertile environment for these policies to flourish even without direct strategic guidance.

As the parallel developments of policy and strategy finally met in the CAMDA, the nation gained a functional ends, ways, and means equation. The risk inherent is minimal, as the desired ends, defined in national strategies, thoroughly cover all aspects of the threat, both non-proliferation and counter-proliferation measures, and are effectively supported by those policy initiatives that were developed in parallel. While success of the policy seems to be evident, the primer policy that enabled much of the progress, the Patriot Act, is about to expire. The fiscal means established in the CAMDA are primarily directed at technology solutions for aircraft and airfields, which will require current foreign policy to continue to rely on, the soon to expire, Counterterrorism Funds in the Patriot Act. The Patriot Act, which expired at the end of 2005 and continues to be only incrementally extended, must be re-approved if these coffers are to remain open.

Without the vast fiscal outlays that are supported with the Patriot Act's Counterterrorism fund or other U.S. supplemental funding, many of these departmental supported policies will rapidly wane. With lacking means, the mismatch in the ends, ways, and means equation will develop an ever increasing risk for the U.S and our allies. However, this risk can be mitigated by ensuring U.S. non-proliferation and counter-proliferation efforts are in synchronization with international efforts and thus qualify for specific internationally appropriated funds such as the G-8's \$20 billion pledge. Keeping these programs and policies intact and in place will be vital to making the transition to the next phase of MANPAD defense, as they will continue to play a key role

Move to a Layered Defense in Depth

Non-proliferation and counter-proliferation policy have been valid tools to combat the MANPAD threat but they will prove insufficient unless integrated into a larger synergistic defense. A recent study by the RAND Corporation indicated that while a technical solution to mount tactical decoys and jammers on civilian airliners, to counter the threat, could be completed soon, it could never hope to be 100% effective. "Its utility was statistically and cost effectively minimal unless it was part of a layered and integrated defense. This defense should integrate foreign policy with technological solutions and law enforcement operations to provide a competent airport security perimeter."¹⁸

To combat this ominous threat of MANPADS verses civilian airliners a new strategic paradigm must be struck. Drawing from the guidance in the national strategy documents that

have enabled U.S. non-proliferation efforts, and extrapolating further from the recently approved CAMDA and Intelligence Reform Act, the U.S. must develop a layered and synergistic defense that continually denies access to weapons, launch envelopes and targets while preserving the airline transportation industry and the sanctity of the public's privacy. The suggested approach is a defense in depth that begins with foreign policy and proliferation efforts beyond our borders to deny access to weapons. These efforts are integrated with a national policy and actions to police our borders and ports of entry to deny access to would be terrorists and their weapons. This ring of denial at our borders is further reinforced with a subsequent layer of protection around our airports to defend our civilian aircraft. The final layer, reaction response and reconstitution, is the most critical as it provides the nearest real time actions that will ultimately determine the success or failure of the strategy.

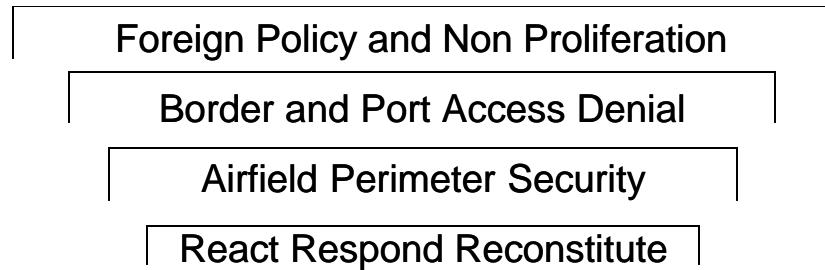


FIGURE 1

While International proliferation efforts attempt to negate the threat beyond our borders, the overwhelming numbers of weapons already produced and traded around the globe make it irresponsible for us to not consider that many have already escaped visibility into the hands of terrorists or rogue leaders who desire to achieve some element of a mass effect against the United States. These "lost" weapons, coupled with just a single determined enemy, could still pose a grave threat. These weapons and their shooters cannot be wishfully or statistically ignored and must be intercepted in a dedicated follow-on layer of defense. The Immigration, Customs, and Border Control Agencies of the United States present this second major layer of the MANPAD strategic defense.

The current influx of undocumented immigrants across the northern and southern borders of the United States and the U.S. Government's seemingly inability to stop the flow is the dilemma in identifying and stopping potential terrorists who may act as shooters. Biometric identification of all (legal and illegal) immigrants matched with growing data bases of terrorists is

but one element of the future “smart borders” envisioned by the U.S. Immigration Service. A robust increase in the applied technology and the number of fielded border monitoring systems and in the manpower assigned to the task are necessary to not only stem the illegal tide but more importantly to catch and screen out the hostile individuals. Borders crossings, however, are not the only means of illegal entry in to the U.S. Increasingly customs officials and the Coast Guard are interdicting personnel inside the myriad of shipping containers on the nearly 10,000 vessels that pass through our trade centers and waterways yearly.

The requirements imposed for life support to sustain humans for this kind of entry make the task of detecting and interdicting them somewhat commonplace. However, the ability to detect a MANPAD, with the footprint roughly the size of a large suitcase, under similar conditions is a far more complex task. Customs inspectors must be educated on the physical signature of components and given the policy authority to inspect shipments at the point of embarkation. Although these inspections would slow trade shipments, modifications to U.S. trade policy and procedures regarding this issue are in progress. Additionally, high technology equipment tailored to look for NBC threats could also be tasked to scan for the trace elements of the rocket propellant, warhead explosives, or the detector material. The chemical and/or radiological fingerprints of these subcomponents, for many MANPADS, are already on file in the missile forensics labs in China Lake and Redstone Arsenal.

While the United States is balancing its speed of trade and immigration laws with detailed inspections and biometric profiles, it will continue to incur the risk of the MANPAD threat’s entry into the homeland. Even with the most stringent constraints, the physical nature and character of the weapon with its ease of employment will have to be assumed as a viable threat that is already inside our borders. To combat those elements that have already seeped through or that will soon follow, another layer of defense is necessary.

Airport perimeter security is that next layer in defending civilian airliners from the MANPAD threat. With a lethal engagement envelope of 2 to 3 miles and up to 10,000 feet, the MANPAD weapons provide the highest danger to aircraft take-off and recovery operations near the airport. As airliners depart airfields, not only are they in the heart of the weapon’s engagement envelope but they typically have very large thermal signatures due to the high power settings required for takeoff and from the wheel and brake elements that have been heated during the take-off roll. Recovering aircraft also have large exhaust plumes and have additional thermal signatures from aircraft skin friction and heated devices on the surface of the aircraft. While certain precautions can mitigate some of these elements and reduce a missiles acquisition range against an airliner, there are no fielded technological means to deny a

MANPAD gunner a civilian airliner as a target. Many of the issues and solutions addressing this specific topic are being approached on classified levels due to their sensitivity, but some general level ideas will be discussed here.

To negate a shooters ability to employ in these environments, airports must establish a detailed and integrated surveillance and defense response in and around the airport surface area. Albeit this is an extremely large area, especially if the departure and arrival corridors that place the aircraft inside the envelope are also taken into account. Surveilling the entirety such large areas is beyond the fiscal or operational capability of any large airport or metropolitan agency. However, national surveillance systems could be used to provide imagery for intelligence analysis to locate and predict likely or possible launch sites. Once identified, the most likely sites could be monitored with fewer (and more cost effective) long dwell staring systems to warn of activity in these areas. The drawback to such a system would be any infringement on personal privacy that could occur if the predicted launch point falls within a public area. Of course fields of view, look angles and resolution could be modified to minimize this possibility, but there will undoubtedly be some areas that will preclude over-watch due to Intelligence Oversight concerns.

The public, and its right to privacy, should not be looked at as an obstacle in this arena. Instead, as suggested in the Intelligence Reform Act, local and federal authorities should establish a civilian watch network to augment and enhance these technology means. Community watch programs could be educated on the physical clues and telltale indicators of the threat, as well as any likely launch sites in their neighborhoods. Public access reporting sites for phone and computer tips should be established with access for airport security, local and federal law enforcement, as well as intelligence communities. Co-opting the public cooperation and participation in the pursuit of this strategy will be a key aspect to broadening chances for success and avoiding perceptions that this strategy is an opportunity for Big Brother to violate individual rights for public safety.

The need for cross cutting policies regulating intelligence sharing and interagency cooperation is paramount to achieve an effective layer of defense at this level. Any intelligence gathered at higher levels indicating the possibility for an incident must be passed to all agencies to facilitate a higher level over-watch and more thorough sweep of perimeter areas. First responders, must also be informed to step up readiness and or initiate interdiction operations. This will likely require a new communications network or significant restructuring of existing methods to link these assets and agencies into a viable, and hopefully impenetrable, architecture.

This network will also be critical for the final layer of defense which I will term the R3 or "R-Cubed" level. Should the threat penetrate the outer elements of the layered defense, Americans must be prepared to react, respond and reconstitute (R3). The threat of MANPADS or actual employment cannot be allowed to cripple the American civilian transportation system. Any threat must be dealt with quickly and effectively to maintain the public's confidence. "R3", while the last line of defense, will be the most crucial to the success of the overall strategy. "R3" plans should incorporate actions as follows:

- React
 - To defeat any engagements.
- Respond
 - To increase surveillance and inter-agency force readiness
 - To interdict and investigate launches
 - To mitigate and counter imminent threats
 - To handle emergencies and damage control issues
- Reconstitute
 - To re-enable operations as soon as possible.

In countering the threat of a MANPAD launch, the RAND study and emerging congressional initiatives have adopted a mindset of technology defenses for the aircraft itself. These defenses range from deployable decoy flares, to IR lasers intended to confuse and jam missile seekers, to lasers acting as destruct mechanisms. The business methodology and technical prowess that has been brought to bear to integrate these tactical systems into the civilian fleet has been immense. However, the associated cost is also immense. "The price tag to outfit the 6800 U.S. civilian airliners with only a single laser jammer is \$11 billion."¹⁹ Even with a public/ private cost sharing program to meet the mandating the outfitting of the American civilian airline fleet, there is still the significant volume of foreign carriers operating at U.S. airfields that will still be susceptible and will be unable to comply for some time. "The damage and loss of life incurred by a single lethal MANPAD incident is estimated at \$1 billion, and that is only for aircraft replacement costs and legal estimates to monetary compensation for the passenger loss of life. The effects to personnel and structures on the ground, especially in an urbanized area would greatly multiply that figure."²⁰ This technology solution should be viewed as a necessary but integral part of the larger layered defense and not a solution unto itself. It will serve aptly as the critical element of the "React" phase of the R3 layer of defense.

Upon notification of a credible threat, or possibly after an actual MANPAD engagement, the first order of "Response" should be to deny the enemy the opportunity to employ any further

weapons. Surveillance should be substantially increased and Quick Reaction Interdiction and Investigation Teams (QRIIT), composed of a combination of local and federal elements, should be put into the launch site and other advantageous positions. The intent is for these teams is to hopefully apprehend the terrorists, but at a minimum to assess the forensic evidence at the launch site and begin a modified search for other launch sites and suspects based on that evidence.

With these teams staging or responding to a site to investigate, air traffic control agencies across the region, under guidance and authority from the Federal Aviation Administration (FAA), the National Transportation Safety Board (NTSB) and appropriate national authorities, would also begin take action. They would need to hold, stagger and/ or re-route traffic as necessary based on the severity of the situation. Obviously, departures could be held or cancelled, but inbound traffic presents a different issue. In the event it is necessary to divert enroute traffic due to a destination airport with a significant and imminent threat, the FAA and civilian carriers must have established plans and divert airfields. One recommendation would be to codify relations with DoD facilities across the nation to host the recovery and protection of the diverted aircraft. With base security forces, the perimeters and approaches could be much more easily secured. Host base military aircraft could also provide terminal approach escort to civilian airliners and an option to mask them as a target with the defensive countermeasures onboard the tactical aircraft.

Should a disaster occur, emergency crews must be prepared, during their response, to coordinate with Inter-Governmental Agencies for evidence recovery and forensic analysis. Lessons from the crash of TWA flight 800 bear out that the NTSB crash investigators must be augmented with teams from specialized DoD, FBI, CIA, and Intelligence agencies in a supporting role. While life saving measures and site stabilization are priorities for local first responders, investigative actions must begin immediately to assess the gravity of the impending threat.

Reconstitution of flight operations can only begin when the threat has been identified, isolated and reduced. These efforts will be carried out as the layered elements of the defense are re-engaged with the detailed intelligence from the rapid investigations, which will allow focused actions to negate the threat. While reconstitution efforts must be thorough they must also be expeditious. "During ongoing efforts, a RAND Study estimates, the airline industry will be bleeding revenues at a rate of 3 billion a week if a shut down of operations occurs. Neither the American public nor the airline industry could fiscally endure a sustained shut down. As well the psychological impact of any shut down due to a MANPAD threat or incident could cost an

estimated 14 billion projected earnings over the following months if customers were reluctant to return to flying.”²¹

One of the architects of the Intelligence Reform act, the Democratic Representative from New York, Steve Isreal, couched the basic argument of the entire issue in one sentence, “One \$5000 missile hitting an airliner would be the end of the aviation industry as we know it.” This cannot be allowed to happen. Current policy initiatives to curb proliferation must be augmented to include the direction from the CAMDA and the Intelligence Reform Acts. To do that the U.S. will need to draft a strategy based on a layered defense. The wisest and seemingly most effective solution would be to build inward from our current proliferation barriers and provide multiple layers relying on intelligence sharing and inter-agency cooperation. Technology and procedural advancements must be included but cannot be relied upon as the only solution.

“Since 1978 there have been 35 attempts, globally, to shoot down civilian aircraft with MANPADS. These attempts have resulted in the loss of 24 aircraft and 640 deaths.”²² The reality is that the threat is real, it has proved itself effective, and has the capability, or at least the possibility, to penetrate to a lethal launch area. How long will the U.S. take to develop a comprehensive plan to prevent such a catastrophe? Debates over fiscal outlays and single veined technology solutions only prolong the process. All the while, illicit arms circle the globe virtually unchecked, illegal aliens and material penetrate our borders and our airliners traverse dangerous corridors unprotected and without a plan to respond to a threat. The vast resources of the airline and travel industry, if damaged by the MANPAD threat, could deal a severe blow to the world’s economies. The answer is to act now and in conjunction with our global partners.

Endnotes

¹ Young, Don (Senator Alaska). *Report to Congress H.R. 4056*. U.S. Government. 108th Congress. House of Representatives. June 23, 2004. Retrieved [5 Dec 2005] from, <http://thomas.loc.gov/cgi-bin/cpquery/T?&report=hr565p1&dbname=108&>

² National Military Strategy of the United States of America 2004. *A Strategy for Today; A Vision for Tomorrow*. U.S. Government. Joint Chiefs of Staff. 2004. p.1.

³ The National Security Strategy of the United States of America. *September 2002*. U.S. Government. President of the United States. September 2002. pg. 6.

⁴ Ibid. p.14.

⁵ The National Defense Strategy of the United States of America. *March 2005*. U.S. Government. Secretary of Defense. March 2005. pg 2.

⁶ Ibid. p.4.

⁷ National Military Strategy of the United States of America 2004. *A Strategy for Today; A Vision for Tomorrow*. U.S. Government. Joint Chiefs of Staff. 2004. p.17.

⁸ Ibid. p.6.

⁹ National Strategy for Combating Terrorism. *February 2003*. U.S. Government. President of the United States. February 2003. p 17, 21.

¹⁰ H.R. 3162. *Patriot Act*. U.S. Government. 107th Congress. October 24, 2001. Retrieved [5 Dec 2005] from, <http://www.epic.org/privacy/terrorism/hr3162.pdf>

¹¹ Wassenaar Agreement. *Elements for Export Control of Man-Portable Air Defense Systems (MANPADS)*. 2003 Plenary. Retrieved [5 Dec 2005] from, http://www.wassenaar.org/2003Plenary/MANPADS_2003.htm.

¹² 2003 G-8 Summit. *Enhance Transportation Security and Control of Man-Portable Air Defence Systems (MANPADS) A G-8 Action Plan*. Retrieved [5 Dec 2005] from, http://www.g8.fr/evian/english/navigation/2003_g8_summit/summit_documents/enhance_transport_security_and_control_of_man-portable_air_defence_systems_-_manpads_-_a_g8_action_plan.html

¹³ APEC 2003 Leader Declaration. Bangkok *Declaration on Partnership for the Future*. Retrieved [5 Dec 2005] from, http://www.apec.org/apec/leaders_declarations/2003.html

¹⁴ Department of State. Office of Weapon Removal and Abatement Web Site. Retrieved [5 Dec 2005] from, <http://www.state.gov/t/pm/wra/>.

¹⁵ Department of State Web Site. *United States and Hungary Agreement on Destruction of Man-Portable Air Defense Systems (MANPADS) Missiles*. Retrieved [5 Dec 2005] from, <http://www.state.gov/r/pa/prs/ps/2005/54177.htm>.

¹⁶ Department of Defense. Defense Threat Reduction Agency Web Site. *Arms Control/Small Arms and Light Weapons*. Retrieved [5 Dec 2005] from, <http://www.dtra.mil/Toolbox/Directories/OSI/Programs/smarms/liaison.cfm>

¹⁷ H.R. 4056. *Commercial Aviation MANPAD Defense Act 2004*. U.S. Government. 108th Congress. March 30, 2004. Retrieved [5 Dec 2005] from, https://www.myaoc.org/eweb/images/aoc_library/Advocacy/Legislative/ManPads/CAMDA_HR4056.pdf

¹⁸ Chow, James (etal). *Protecting Commercial Aviation Against the Shoulder-Fired Missile Threat*. RAND Corporation. Santa Monica California. 2005. p. xi-xii.

¹⁹ Ibid. p. x.

²⁰ Ibid. p. 7.

²¹ Ibid. p. 9.

²² Ibid. p. 5.